

Curriculum Standard: The student will demonstrate an understanding of the ways biology affects their lives and the industry of agriculture. The student will use the scientific method and research techniques to understand: chemical basis of life, cell structure and function, cellular communication, and different energy systems.

UNIT ONE

Performance Objective	Critical Attributes	Benchmarks/Assessment
1. The student will show a relationship between biology and the industry of agriculture.	A. Can the student identify the way biology affects agriculture and your life?	<ul style="list-style-type: none"> • The student will list the ways that biology affects life and agriculture now and in the future. • The student will list three biology related decisions agriculture must address.
2. The student will demonstrate the use of the microscopes.	A. Can the student use a microscope correctly?	<ul style="list-style-type: none"> • The student will use prepared slides and make a wet mount to observe and sketch under low, medium, and high power.
3. The student will utilize the scientific method in solving problems.	A. Can the student show how scientists apply the scientific method to solve problems?	<ul style="list-style-type: none"> • The student will apply the scientific method to solve a problem. (Agri-science Fair)
4. The student will describe the differences between living and nonliving things.	<p>A. Can the student distinguish between living and nonliving things?</p> <p>B. Can the student illustrate how living things are built from basic chemicals?</p>	<ul style="list-style-type: none"> • The student will survey living and nonliving things. • The student will distinguish between macromolecules and agricultural products.

Performance Objective	Critical Attributes	Benchmarks/Assessment
5. The student will identify molecules of life and explain their function.	<p>A. Can the student demonstrate a knowledge of basic structure, chemical composition, and functions of the cell membrane?</p> <p>B. Can the student relate a knowledge of cell structure and function?</p>	<ul style="list-style-type: none"> • The student will explain how a cell membrane helps a cell maintain homeostasis.
6. The student will examine cell structure and relate structure to function.	<p>A. Can the student show how cells receive information and regulate movement of material into and out of a cell?</p> <p>B. Can the student demonstrate a knowledge of cell reproduction?</p>	<ul style="list-style-type: none"> • The student will identify cell parts and functions. • The student will explain how molecules pass through a cell membrane. • The student will compare and contrast cell division in mitosis and meiosis.
7. The student will compare and contrast photosynthesis and respiration.	<p>A. Can the student explain how photosynthesis provides the energy needed for all living things?</p> <p>B. Can the student indicate the importance of cellular respiration in living things?</p>	<ul style="list-style-type: none"> • The student will explain how green plants convert sunlight into chemical energy. • The student will explain how the energy from plants is used to produce animal protein and fiber.

Curriculum Standard: The student will demonstrate an understanding of how an organism’s heredity is the product of the genetic changes in its ancestors, how organisms can respond to changes in their environment, how species evolve through the process of natural selection, and how heredity can be manipulated to benefit agriculture and man.

UNIT TWO

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will examine Mendel’s Laws and explain relationships.</p> <p>2. The student will compare and contrast differences between chromosomes and genes.</p> <p>3. The student will generalize the relationship between meiosis and mitosis.</p>	<p>A. Can the student compare and contrast each of Mendel’s Laws of heredity?</p> <p>A. Can the student demonstrate knowledge of the relationship between chromosomes and genes?</p> <p>A. Can the student identify events occurring during meiosis that result in variation?</p> <p>B. Can the student demonstrate an understanding of the structure of DNA and the process of DNA replication?</p> <p>C. Can the student describe protein synthesis?</p>	<ul style="list-style-type: none"> • The student will solve a Mendelian cross and explain the results using the following terms: dominant, recessive, heterozygous, and homozygous alleles, genotype, and phenotype. • The student will explain the relationship between genes and chromosomes. • The student will explain how the laws of segregation and independent assortment are demonstrated by the patterns of chromosome behavior during the process of meiosis. • The student will construct a model of the DNA Double Helix. • The student will define the importance of protein synthesis in living things.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>4. The student will analyze how gene technology is utilized in agriculture and medicine.</p>	<p>A. Can the student identify relationships between agriculture and medicine?</p>	<ul style="list-style-type: none"> • The student will list three medical contributions of animal agriculture. • The student will identify three agricultural plants cultivated for medicinal purposes. • The student will report on the current breakthroughs in gene therapy in agriculture.
<p>5. The student will compare and contrast the arguments supporting evolution and creation.</p>	<p>A. Can the student identify relationships between evolution and creation?</p> <p>B. Can the student demonstrate an understanding of how natural selection occurs?</p>	<ul style="list-style-type: none"> • The student will explain two major ideas supporting creation and evolution. • The student will create a timeline outlining the changes occurring during the evolution of the horse.
<p>6. The student will demonstrate an understanding of the theories of creation of life on earth.</p>	<p>A. Can the student explain the theories of creation of life?</p>	<ul style="list-style-type: none"> • The student will defend and justify their position on the creation of life on earth.

Curriculum Standard: At the end of unit three, the student will demonstrate an understanding of how systems in nature interact to maintain homeostasis and how human activities may disrupt this stability. The student will show how agriculture affects and is affected by the environment around it.

UNIT THREE

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The student will demonstrate energy flow through an ecosystem.</p>	<p>A. Can the student explain how energy flows through the different trophic levels of an ecosystem?</p> <p>B. Can the student explain nitrogen, water, and carbon cycles within ecosystems?</p>	<ul style="list-style-type: none"> • The student will explain the flow of energy through an ecosystem. • The student will trace the pathway of carbon between living organisms and the environment. • The student will describe how nitrogen is recycled within ecosystems.
<p>2. The student will identify the world's biomes.</p>	<p>A. Can the student distinguish between the world's biomes?</p>	<ul style="list-style-type: none"> • The student will construct a biome tower. (Bottle Biology) • The student will design a poster depicting one of the world's biomes.
<p>3. The student will demonstrate an understanding of ecosystems and interactions within the environment.</p>	<p>A. Can the student exhibit understanding of the role of coevolution in shaping the structure of ecosystems?</p> <p>B. Can the student compare the three types of symbiotic relationships?</p>	<ul style="list-style-type: none"> • The student will relate the characteristics of flowers to their coevolution with insects. • The student will describe how plants and their herbivores have coevolved. • The student will contrast parasitism, mutualism, and communalism.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>4. The student will demonstrate an understanding of the environment and some of the problems faced by the world's ecosystems.</p>	<p>C. Can the student explain the relationship between niche and succession?</p> <p>D. Can the student recognize the roles of ecosystem size and latitude in determining diversity and stability?</p> <p>A. Can the student demonstrate a knowledge of how changes in natural habitats can have a drastic impact on ecosystems?</p> <p>B. Can the student explain the effects of acid rain, ozone depletion, and global warming on the biosphere?</p> <p>C. Can the student identify ways pollution has been reduced in the United States?</p> <p>D. Can the student identify renewable and nonrenewable resources?</p>	<ul style="list-style-type: none"> • The student will contrast the concepts of niche and habitat. • The student will explain how competition can cause changes in an ecosystem. • The student will describe the steps in the succession of a specific ecosystem. • The student will compare and contrast high-diversity ecosystems and low-diversity ecosystems. • The student will explain the impact of domestic livestock in an ecosystem. • The student will explain the effects of acid rain, ozone depletion, and global warming in the form of a report and/or presentation. • The student will list programs in the community that reduce pollution and how they impact agriculture. • The student will list renewable and nonrenewable resources commonly used in agriculture.

Performance Objective	Critical Attributes	Benchmarks/Assessment
	<p>E. Can the student identify environmental challenges faced by agriculture?</p>	<ul style="list-style-type: none">• The student will write a research paper outlining an agriculture challenge and the potential solutions.• The student will defend their position on the environmental arguments presented regarding agriculture policy and choices.

Curriculum Standard: At the conclusion of unit four, the student will demonstrate an understanding of the diversity and classification of bacteria, viruses, protists, fungi, and plants. The student will describe their economic value and effects on people and the production of food and fiber.

UNIT FOUR

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>1. The students will utilize classification systems of living things.</p> <p>2. The students will distinguish and differentiate the five kingdoms.</p>	<p>A. Can the student demonstrate an understanding of the scientific system of naming organisms?</p> <p>A. Can the student distinguish between the structures and functions of bacteria and viruses?</p> <p>B. Can the student identify beneficial and harmful effects of bacteria and viruses?</p>	<ul style="list-style-type: none"> • The student will define the term “species”. • The student will list and identify characteristics of the five kingdoms. • The student will explain the components of binomial nomenclature. • Using a taxonomy guide, the student will outline the taxonomy of any of the common domestic animals. • The student will explain why viruses are not living organisms. • The student will draw and label basic structures for bacteria and viruses. • The student will explain how bacteria reproduce and obtain energy. • The student will list three ways bacteria are beneficial. • The student will list five bacterial diseases and five viral diseases of humans and livestock. • The student will summarize ways to prevent and control bacterial and viral diseases.

Performance Objective	Critical Attributes	Benchmarks/Assessment
<p>3. The student will demonstrate an understanding of plant science and advancements within the plant science field.</p>	<p>A. Can the student outline the structure and function of protists?</p> <p>B. Can the student identify diseases of living things caused by protists?</p> <p>C. Can the student demonstrate a knowledge of the basic classification, structure, and function of fungi?</p> <p>D. Can the student demonstrate an understanding of structure and function of plant systems?</p> <p>E. Can the student list plant products and their uses?</p> <p>F. Can the student explain the benefits and limits of modern crop science?</p>	<ul style="list-style-type: none"> • The student will explain how viruses reproduce. • The student will list three uses of bacteria in the food industry. • The student will locate, draw, and describe various protists from microscopic investigations. • The student will explain in essay form the efforts to control a protist caused disease. • The student will summarize the ecological and economic roles of fungi. • The student will describe characteristics of the four divisions of fungi. • The student will describe adaptations that allow plants to survive on land. • The student will complete fungi growing activity. (Mushroom Lab)

Curriculum Standard: The student will be able to use the computer as a resource to collect information, complete lab reports, lay out presentations, and record keeping. The student will learn to follow specific scientific directions and write technical explanations.

TECHNOLOGY ENHANCEMENT

Performance Objective	Critical Attributes	Benchmarks/Assessment
1. The student will demonstrate keyboarding, touch-typing, and word processing skills.	A. Can the student word process using multiple fonts and margins?	<ul style="list-style-type: none"> • The student will complete lab reports using computer word processing techniques.
2. The student will demonstrate the use of a spreadsheet for keeping records.	A. Can the student save and retrieve data on computerized record books?	<ul style="list-style-type: none"> • The student will complete budget and journal entries on spreadsheet in computerized FFA record book.
3. The student will demonstrate the use of the database to organize and store data.	A. Can the student input lab data and organize it into a useable format?	<ul style="list-style-type: none"> • The student will input lab data, sort, organize, and print out in graph format.
4. The student will demonstrate uses of the computer to gather research information.	A. Can the student find and print information from electronic database?	<ul style="list-style-type: none"> • The student will create and then manipulate information in a database to merge and construct documents.
5. The student will demonstrate technical writing.	A. Can the student write technical, sequential instructions to complete a scientific task?	<ul style="list-style-type: none"> • The student will describe the steps and techniques used to setup a microscope and focus on a prepared slide.
6. The student will demonstrate technical reading skills.	A. Can the student follow a sequential set of instructions to complete a technical task?	<ul style="list-style-type: none"> • The student will read lab instructions and complete lab using the written instructions as a guide.